

UK Patent Application (12) GB (19) 2 322 066 A

(43) Date of A Publication 19.08.1998

(21) Application No 9703286.6

(22) Date of Filing 17.02.1997

(71) Applicant(s)

Vax Limited
(Incorporated in the United Kingdom)
Quillgold House, Kingswood Road, Hampton Lovett,
DROITWICH, Worcs, WR9 0QH, United Kingdom

(72) Inventor(s)

Geoffrey Martin Brewin

(74) Agent and/or Address for Service

Forrester Ketley & Co
Chamberlain House, Paradise Place, BIRMINGHAM,
B3 3HP, United Kingdom

(51) INT CL⁶
A47L 11/30

(52) UK CL (Edition P)
A4F FSNS

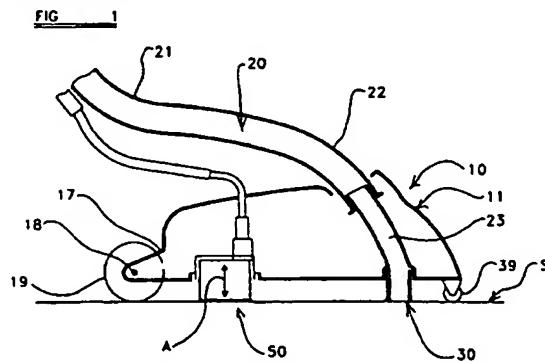
(56) Documents Cited
GB 2031270 A US 4339841 A US 3992747 A

(58) Field of Search
UK CL (Edition P) A4F FQMX FSLA FSNF FSNS
INT CL⁶ A47L 7/00 11/30

(54) Abstract Title

Cleaning head with fluid delivery and removal means

(57) A cleaning head 10 for surface cleaning comprises agitating means 50 engageable with the surface S for agitating cleaning liquid thereon; means (40 fig 5) for delivery of a cleaning liquid to the surface in the region of the agitating means 50; air passage means 20 adapted for connection to a source of suction; collecting means 30, engageable with the surface and communicating with the air passage means 20, for collection of liquid from the surface by suction; means for effecting relative movement between the agitating means 50 and the collecting means 30 in a direction which, in use, is generally perpendicular to the surface being cleaned. The agitating means 50 comprises a transversely extending strip (51 fig 5) of porous material, having a width in the fore-and-aft direction much less than its transverse length. The means 40 for delivery of the cleaning liquid is arranged and constructed to deliver said liquid at a transversely extending edge face of the porous strip (51) so that said liquid can flow onto the surface S without passing through the strip, and includes a transversely extending distribution duct (52, 53 fig 5) which is disposed above the agitating means and is closed apart from an inlet aperture and a plurality of transversely spaced outlet apertures. The cleaning head is mounted on an operating member 21 which is adapted to be held by a user to facilitate movement of the head over the surface to be cleaned, and the air passage means 20 includes a pivotal connection (16, 24 fig 5) which enables relative angular movement between the cleaning head and said operating member. The cleaning head is adjustable between respective cleaning and drying modes of operation and when the head is in its cleaning mode both the agitating means (50) and the collecting means 30 co-operate substantially equally with said surface, whereas when the head is in its drying mode the collecting means co-operates predominantly or exclusively with said surface. Various arrangements are described relative adjustment of the agitating means (50) and the collecting means 30 as necessary to achieve this.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy. The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1995. This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

GB 2 322 066 A

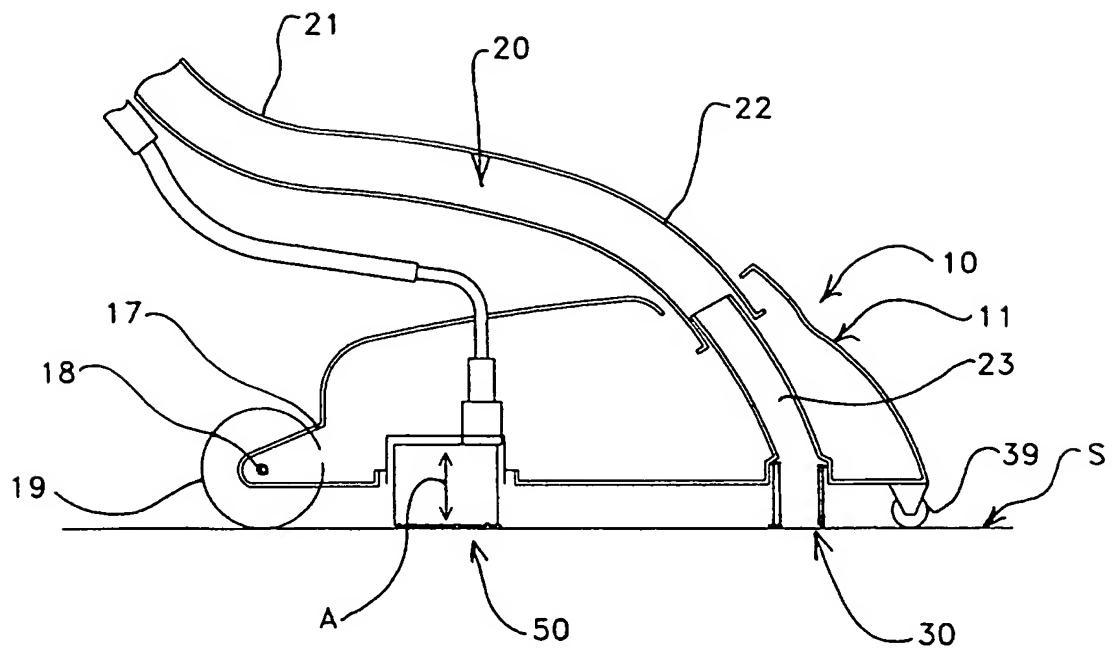
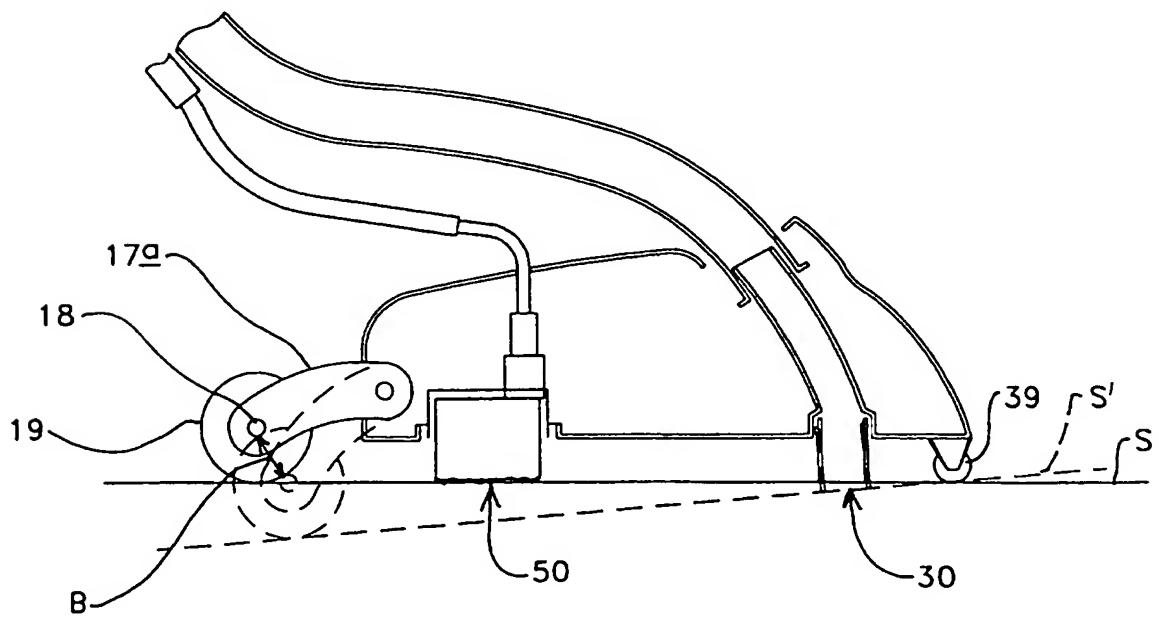
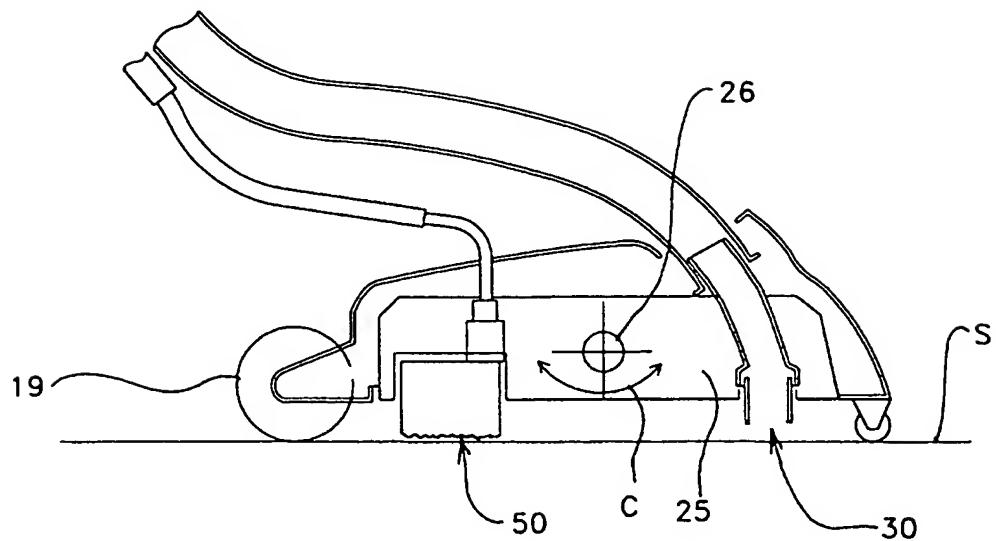
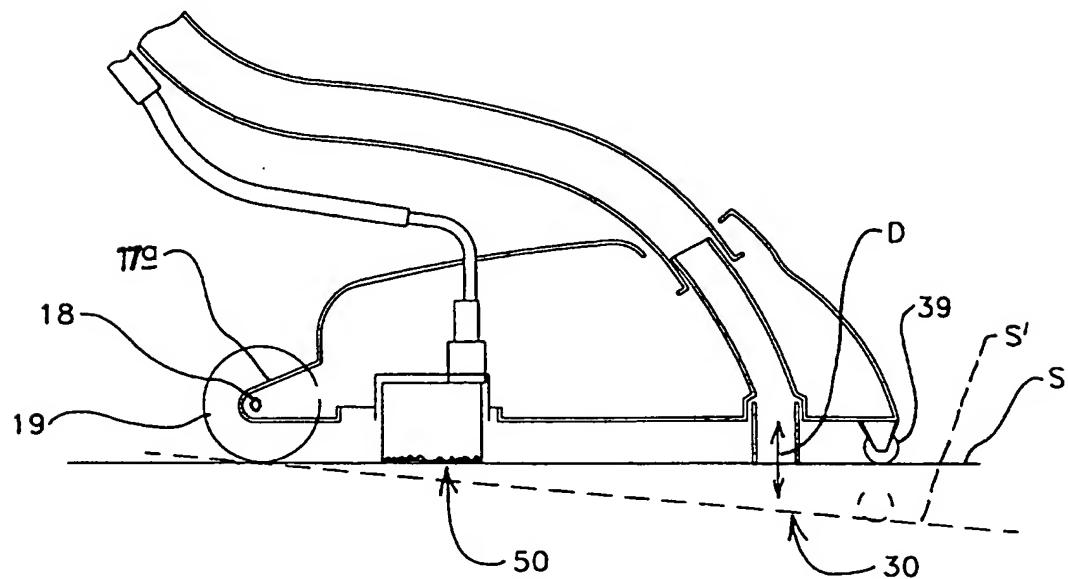
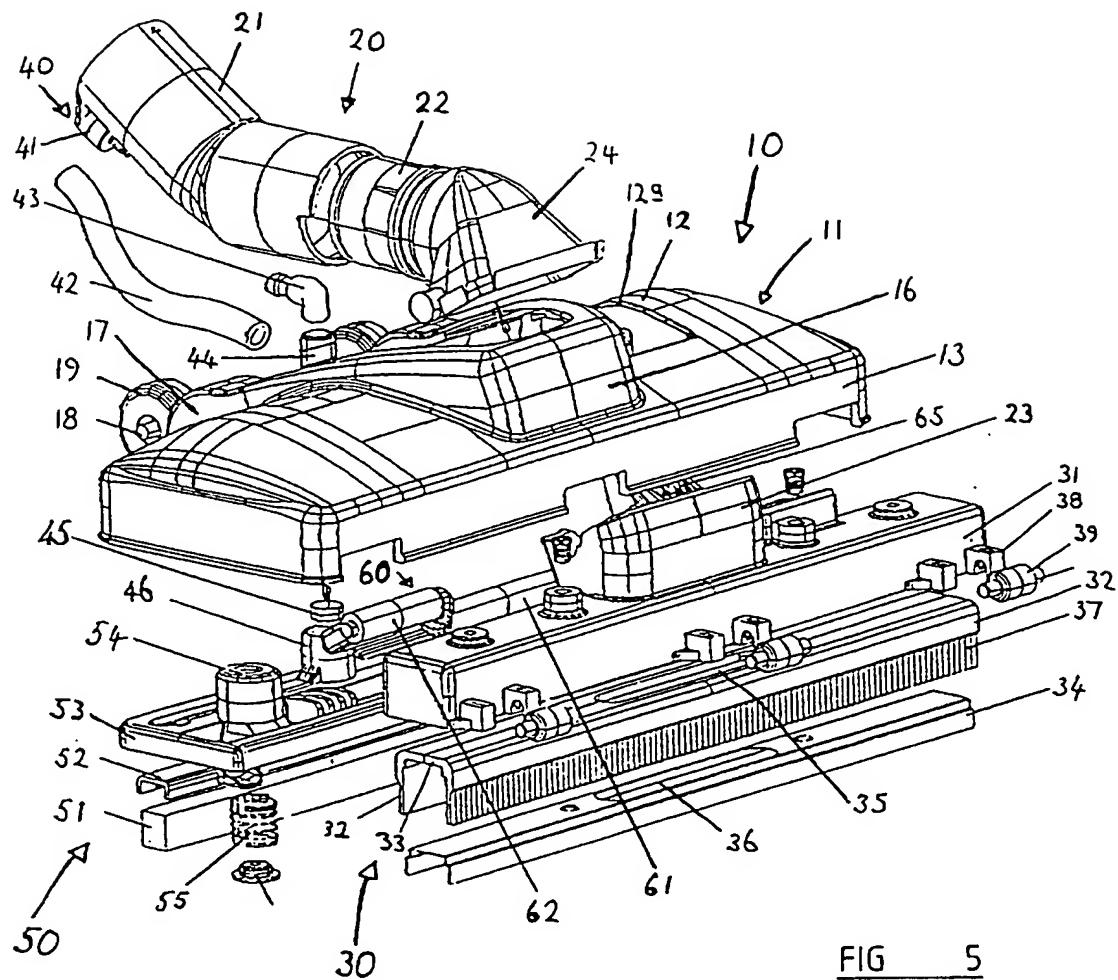
FIG 1FIG 2

FIG 3FIG 4

FIG 5

Title: **CLEANING HEAD**

Description of Invention

This invention relates to a cleaning head, for an apparatus for cleaning a surface by application of a cleaning liquid to the surface and removal of the cleaning liquid from the surface by suction.

More particularly, the invention relates to a cleaning head suitable for use in such cleaning of floor surfaces which are of a relatively unyielding and non-absorbent nature. Examples of materials commonly used for floors or floor coverings, and affording surfaces of the type with which the invention is intended to be used, comprise plastics materials, e.g. vinyl, in the form of a large sheet or small portions constituting "tiles" laid on an underlying supporting surface; ceramic materials, e.g. glazed or unglazed tiles; rubber based materials; or wood, cork or concrete if the surface is sealed with a suitable coating to prevent or reduce absorption of liquid.

There have been many proposals for apparatus for cleaning such surfaces by the application of a cleaning liquid thereto and removal of such liquid, together with dirt removed thereby from the surface, by suction. The cleaning liquid may be water containing a suitable detergent. Cleaning heads for such apparatus, which may be provided as part of single-purpose cleaning appliances or as accessories for multi-purpose cleaning appliances of the suction cleaner ("vacuum cleaner") type, usually include means for distributing the cleaning liquid on to the surface to be cleaned, at least one passage arranged to be connected to a source of suction and having at least one opening arranged to collect liquid from the surface being cleaned, and means for agitating the cleaning liquid whilst in contact with the surface to assist the action thereof in removing dirt from the surface. The agitating means typically comprises a brush or brushes which may be static or which may be arranged to be driven, e.g. rotated, by means such as an electric motor provided in or in association with the cleaning head.

Alternatively a sponge or mop element may be provided, e.g. of suitable plastics or rubber foam or cellular material.

The effectiveness of a cleaning head of the general kind with which the present invention is concerned is judged by a user in terms of the quality of its cleaning action and of its ability to remove liquid together with loosened dirt from the surface being cleaned. Desirably, the surface should be left dry or almost dry so that any liquid remaining on the surface evaporates quickly.

One such cleaning head, and an appliance having such a head, are disclosed in our International patent application, Publication No. WO96/25872.

The object of the present invention concerns various modifications or improvements to such cleaning head.

It will be appreciated that a cleaning head in accordance with the invention normally is used in a predominantly reciprocating motion over the surface being cleaned. Accordingly references herein to the front and rear of the cleaning head, to the length thereof, and analogous expressions, refer to parts of the cleaning head spaced thereon in the intended direction of reciprocation thereof in use, and to dimensions in such direction. Similarly references to the sides of the cleaning head and to the width thereof, and analogous expressions, refer to the direction transverse to the direction of reciprocation of the cleaning head in normal use.

According to one aspect of the present invention, we provide a cleaning head for surface cleaning comprising agitating means engageable with the surface for agitating cleaning liquid thereon; means for delivery of a cleaning liquid to the surface in the region of the agitating means; air passage means adapted for connection to a source of suction; collecting means, engageable with the surface and communicating with the air passage means, for collection of liquid from the surface by suction; and means for effecting relative movement between the agitating means and the collecting means in a direction which, in use, is generally perpendicular to the surface being cleaned in any novel combination with one or more of the following novel features, wherein:-

- (a) the agitating means comprises a transversely extending strip of porous material, the width of said strip in the fore-and-aft direction being much less than its transverse length;
- (b) the means for delivery of the cleaning liquid is arranged and constructed to deliver said liquid at a transversely extending edge face, preferably, the forward edge face, of the agitating means, so that said liquid is caused to flow over said edge face and onto the surface being cleaned;
- (c) the means for delivery of the cleaning liquid includes a transversely extending distribution duct disposed above the agitating means, the duct being closed apart from an inlet aperture and a plurality of transversely spaced outlet apertures;
- (d) the cleaning head is mounted on an operating member which is adapted to be held by a user to facilitate movement of the head over the surface to be cleaned, and the air passage means includes a pivotal connection which enables relative angular movement between the cleaning head and said operating member at least about an axis which extends generally transversely relative to the normal direction of movement of the head over said surface;
- (e) the cleaning head is adjustable between respective cleaning and drying modes of operation and when the head is in its cleaning mode both the agitating means and the collecting means co-operate substantially equally with said surface, whereas when the head is in its drying mode the collecting means co-operates predominantly or exclusively with said surface;
- (f) the agitating means and the collecting means are mounted at fixed positions within the cleaning head and means are

provided for setting the attitude of the cleaning head relative to the surface to be cleaned in order to effect the required relative movement of said agitating means and said collecting means in said perpendicular direction;

(g) the agitating means and the collecting means are both mounted on a common carrier member at fixed position thereon and means are provided for setting the attitude of the common carrier member to effect the required relative movement of said agitating means and said collecting means in said perpendicular direction;

(h) the agitating means are mounted at a fixed position within the cleaning head and the collecting means are mounted in the cleaning head for movement between retracted and extended positions, the arrangement being such that when the collecting means are in said retracted position the agitating means (and optionally the collecting means) are engaged with the surface to be cleaned, whereas in the extended condition of said collecting means the agitating means is held clear of said surface.

According to another aspect of the invention, we provide a vacuum cleaner incorporating a cleaning head comprising any of the above features.

These and other features of the present invention will now be described by way of example with reference to the accompanying drawings, of which:-

FIGURE 1 is a diagram illustrating a preferred embodiment of cleaning head incorporating features (a),(b),(c),(d) and (e);

FIGURE 2 is a diagrammatic illustration of a further embodiment of cleaning head incorporating features (a),(b),(c),(d),(e) and (f);

FIGURE 3 is a diagrammatic illustration of a further embodiment of cleaning head incorporating features (a),(b),(c),(d) and (g);

FIGURE 4 is a diagrammatic illustration of a further embodiment of cleaning head incorporating features (a),(b),(c),(d),(e) and (h); and

FIGURE 5 is an "exploded" perspective view of a cleaning head of the kind illustrated in Figure 1 showing greater constructional detail.

Referring to Figure 1 of the drawings, a cleaning head is indicated generally at 10. The cleaning head is intended primarily to be used as the cleaning head for an appliance such as is shown in Figure 4 of the drawings of our International patent application Publication No. WO94/06342, but it will be appreciated that a cleaning head could alternatively be useable as part of or in association with another appliance, e.g. as a cleaning head for surface cleaning in connection with a multi-purpose cleaning appliance of the suction cleaner type, and may be either mounted directly at the lower end of an appliance which is used in a generally upright or inclined orientation, or connected at the free end of a suction hose from a free-standing appliance.

The head 10 comprises a casing 11 which conveniently is a moulding of a suitable plastics material and which is generally in the form of an inverted shallow trough having rearward extensions 17 in which are supported, for rotation about axes 18, rollers 19 for engagement with a surface (S) on which the cleaning head is to be used to assist in supporting the cleaning head relative to such surface.

Within the head 10 a duct 23 for air extends forwardly and downwardly of the cleaning head and at its lower end communicates with a collecting assembly indicated generally at 30 that is co-operable with the surface (S) for collection of liquid from the surface by suction, which liquid is entrained by air flow to the source of suction to which the cleaning head is to be connected in use.

At its upper end the duct 23 is coupled to an end fitting 22 at the lower end of a hollow handle assembly 21 forming part of a means 20 for applying suction to the head and through which suction is applied in known manner, the connection between the end fitting 22 and the head 10 permitting relative angular movement about at least a transverse axis.

The casing 11 of the cleaning head further accommodates an applicator assembly indicated generally at 50 as described in greater detail hereafter, and comprising means for delivery of cleaning liquid to the surface being cleaned and agitating means adapted to agitate such liquid on the surface to assist the cleaning operation.

In this embodiment the applicator assembly 50 is adapted to be raised and lowered into and out of engagement with the surface to be cleaned, for example by means of a foot-operable pedal and an associated cam operating mechanism as described in our International Patent Application as previously mentioned, in a general vertical direction as indicated by the double-headed arrow (A). In the lowered position, as illustrated in Figure 1, the applicator assembly 50 engages the surface (S), as does the collecting assembly 30. In this condition, the applicator assembly 50 and collecting assembly 30 may each be operatively engaged with the surface (S) so that cleaning liquid can be applied to the surface by means of the applicator assembly 50, whilst at the same time, liquid is collected from the surface by means of the collecting assembly 30. However, it will be understood that if it is desired to increase the dwell time of the liquid on the surface, application of suction to the collection means 30 may be cut off.

The applicator assembly 50 and collecting assembly 30 are held in a predetermined relationship with the surface (S) by virtue of the rollers 19 at the rear of the head 10 and, if necessary, additional rollers 39 at the forward side of the head.

When it is desired to dry the surface (S) finally at the completion of a cleaning operation, the applicator assembly 50 is withdrawn into a raised position in which it is held clear of the surface (S), so that only the collecting assembly 30 then is in operative engagement with the surface.

In the alternative embodiments illustrated in Figures 2, 3 and 4 similar parts to those described above with reference to Figure 1 are indicated by similar numerals.

In the second embodiment illustrated in Figure 2 the rollers 19 at the rear of the head are mounted on arms 17a which are pivotally mounted on the head 10 for movement as indicated by double-headed arrow (B), for example by a similar mechanism as that mentioned for movement of the applicator assembly 50 in the Figure 1 embodiment. In this case, the attitude of the head 10 is not fixed relative to the surface (S), but is adjustable by movement of the rollers 19 between raised and lowered positions, as indicated in Figure 2. When the rollers 19 are in their raised position, both the applicator assembly 50 and the collecting assembly 30 engage the surface (S) in exactly the same manner as indicated in Figure 1. However, when the rollers 19 are in their lowered position, the head 10 is tilted upwardly at its trailing edge to such an extent that the applicator assembly 50 is raised clear of the surface (as now indicated by S') whilst the collecting assembly 30 remains in operative engagement with the surface due to its proximity to the forward rollers 39.

In the third embodiment illustrated in Figure 3, the rollers 19 are at a fixed position relative to the head 10, but in this case the collecting assembly 30 and the applicator assembly 50 are mounted on a common carrier member 25 pivotally mounted at 26 within the head for movement as indicated by the double-headed arrow (C), again by any appropriate mechanism, such as that mentioned in relation to the Figure 1 embodiment. As will be apparent, when the collecting assembly 30 is in a relatively raised position only the applicator assembly 50 is in engagement with the surface (S), whilst when the collecting assembly 30 is in a relatively lowered condition the applicator assembly 50 is then raised clear of the surface and only the collecting assembly 30 is in contact with the surface.

In the fourth alternative embodiment illustrated in Figure 4, the rollers 19 are again at a fixed position relative to the head 10, but in this case the collecting assembly 30 is mounted on the head for movement in a generally vertical direction as indicated by the double-headed arrow (D), again by any appropriate mechanism, such as that mentioned in relation to the Figure 1 embodiment. As can be seen, when the collecting assembly 30 is in a relatively

raised position, both the collecting assembly 30 and the applicator assembly 50 are in engagement with the surface (S), whilst when the collecting assembly 30 is in a relatively lowered condition the head 10 is tilted upwardly at its leading edge in such a manner that the applicator assembly 50 is then raised clear of the surface (as indicated by the line S').

Referring now to Figure 5, the collecting assembly 30 comprises a holder 31 of inverted trough-like form. The holder 31, which opens downwardly and extends substantially across the whole width of the cleaning head, abuts against bosses (not shown) formed at the underside of the top wall 12 of the casing 11 and is secured thereto by screws (not shown). The holder 31 is formed with an aperture mid-way along its transverse length and carries the duct 23 in register with the aperture. The duct 23 extends in an upwardly and rearwardly curving manner into a raised portion 16 of the casing 11 and into overlapping telescopic relationship with a terminal portion 24 of the end fitting 22 in a manner which provides for substantially leak-free connection which permits relative movement between the end fitting 22 and the casing 11 about a transversely extending axis so that the inclination of the handle assembly 21 relative to the cleaning head 10 can be varied by the user. The holder 31 is formed with three pairs of forwardly extending lugs 38 in which are rotatably supported respective further support rollers 39 located in recesses formed in the front wall 13 of the casing 11.

The holder 31 of the collecting assembly 30 accommodates two wiper or squeegee blades 32, each having a respective horizontal flange 33 at its upper end, and the blades are secured in the holder 31 by means of retaining member 34 of inverted U-shape secured by screws (not shown). The flanges 32 abut one another within the holder 31 and are formed with cut-outs that in combination define an aperture 35 in register with the duct 23. The retaining member 34 also has an aperture 36 in register with the aperture 35 and may incorporate a grille and so as to prevent access of large pieces of detritus, e.g. cloth, from entering the

air flow passage through the cleaning head, without substantially restricting such air flow.

The blades 32 are of rubber or like material and are sufficiently flexible to bend forwardly or rearwardly with motion of the cleaning head over the surface. The outer, oppositely facing surfaces of the blades are corrugated as indicated at 37, in known manner. Considering the forward blade 32, when the cleaning head is being pushed forwardly and the blade is bent rearwardly over the surface being cleaned, liquid on such surface can flow through the corrugations 37 to the space between the blades 32, whilst when the head is being moved rearwardly over the surface and the blade is bent towards the front of the cleaning head it acts as a wiper or squeegee blade to retain liquid in the space between the blades. Thence the liquid is readily entrained by air flow through the collecting means to be removed from the surface. In the outermost end portions of the collecting means, such air flow is mainly in the direction parallel to the blades towards the aperture 35, so that the liquid is drawn inwardly towards the central region of the collecting means and then upwardly from the surface.

The applicator assembly 50 comprises agitating means in the form of an elongated strip 51 of open-celled foam plastics material, preferably with a fibre-pile facing layer, extending across substantially the entire width of the cleaning head. The strip 51 provides for spreading of cleaning liquid on the surface being cleaned and for a mild agitation of such liquid. The strip 51 is located in a holder 52 of inverted channel-shape which is secured at the underside of a carrier plate 53. The plate 53 is mounted within the casing 11 for vertical movement by means of guide bushes 54 located on posts (not shown) at the underside of the top wall 12 of the housing 11, and springs 55 are located in the bushes to bias the plate 53 into a retracted or raised position.

For delivering cleaning liquid, which will usually be water containing a suitable detergent, to the applicator strip 51 and thus to the surface being cleaned, liquid supply means 40 are provided, comprising a supply pipe 41 on the handle assembly 21, a flexible connecting tube 42, an inlet fitting 43 on a spigot

44 on the top wall 12 of the casing 11, leading to an internal passage (not shown) which at its lowermost end registers with a liquid shut-off seal 45 disposed within an upstanding boss 46 formed on the upper side of the carrier plate 53. The boss 46 communicates with a downwardly open channel which is formed in the plate 53 and is closed at its underside by the holder 52 to form a transversely extending liquid distribution duct. The duct extends laterally across substantially the entire width of the applicator assembly and a number of spaced recesses are formed in one side wall thereof, which recesses are not closed by the holder 52, so that liquid can escape from the duct through said recesses so as to trickle over the edge face of the holder 52 and onto, and down, the corresponding edge face of the applicator strip 51, so as to be reach the surface to be cleaned without passing through the applicator strip itself.

The applicator assembly 50 is raised and lowered by means of a mechanism 60 comprising a transverse shaft 61 supported at its opposite ends in formations (not shown) extending downwardly from the top wall 12 of the casing in a manner permitting angular movement about a transverse axis. Adjacent its ends, the shaft 61 has respective cam formations 62 which are engageable with the upper surface of the carrier plate 53 of the applicator assembly 50. The shaft is operated by a foot-engageable pedal member 65 which extends upwardly through an aperture 12a in the top wall 12 of the casing so as to be operable in a forwards or rearwards rocking motion by the foot of a user to co-operate with a cranked portion (not shown) of the shaft 61 in known manner in order to impart angular movement to said shaft about the transverse axis.

When the pedal 65 is in one position, the applicator assembly 50 is permitted to remain, under the bias of springs 55, in its uppermost position relative to, and substantially within, the casing 11 of the head, in which position the seal 45 closes off the liquid inlet passage within the spigot 44.

When the pedal 65 is in the other position, the cam formations 62 engage the upper surface of the carrier plate 53 of the applicator assembly 50 to push the latter downwardly against the bias of the springs 55 into a lowermost

position in which the operative face of the applicator strip 51 is substantially co-planar with, or lower than, the lower ends of the squeegee blades 32, and the seal 45 is spaced from the spigot 44 so as to allow liquid to flow into the liquid distribution duct and thence onto the surface to be cleaned.

When the applicator assembly 50 is in its lowermost position relative to the casing 11, the applicator strip 51 projects substantially below the casing 11 and there is engagement between the cleaning head and the surface being cleaned by way of the applicator strip 51, and to a similar or lesser extent by engagement between the squeegee blades 32 and the surface.

It will be understood that, with appropriate modifications, the collecting assembly 30 and applicator assembly 50 as described and illustrated by reference to Figure 5 may be incorporate into the other embodiments of head as illustrated in Figures 2,3 and 4.

CLAIMS :-

1. A cleaning head for surface cleaning comprising agitating means engageable with the surface for agitating cleaning liquid thereon; means for delivery of a cleaning liquid to the surface in the region of the agitating means; air passage means adapted for connection to a source of suction; collecting means, engageable with the surface and communicating with the air passage means, for collection of liquid from the surface by suction; and means for effecting relative movement between the agitating means and the collecting means in a direction which, in use, is generally perpendicular to the surface being cleaned, wherein the agitating means comprises a transversely extending strip of porous material, the width of said strip in the fore-and-aft direction being much less than its transverse length.
2. A cleaning head according to Claim 1 wherein the means for delivery of the cleaning liquid is arranged and constructed to deliver said liquid at a transversely extending edge face of the agitating means, so that said liquid is caused to flow over said edge face and onto the surface being cleaned.
3. A cleaning head according to Claim 2 wherein the means for delivery of the cleaning liquid is arranged and constructed to deliver said liquid at a forward edge face of the agitating means.
4. A cleaning head according to any one of the preceding Claims wherein the means for delivery of the cleaning liquid includes a transversely extending distribution duct disposed above the agitating means, the duct being closed apart from an inlet aperture and a plurality of transversely spaced outlet apertures.
5. A cleaning head according any one of the preceding Claims which is mounted on an operating member which is adapted to be held by a user to facilitate movement of the head over the surface to be cleaned, and the air passage means includes a pivotal connection which enables relative angular movement between

the cleaning head and said operating member at least about an axis which extends generally transversely relative to the normal direction of movement of the head over said surface.

6. A cleaning head according to any one of the preceding Claims which is adjustable between respective cleaning and drying modes of operation and when the head is in its cleaning mode both the agitating means and the collecting means co-operate substantially equally with said surface, whereas when the head is in its drying mode the collecting means co-operates predominantly or exclusively with said surface.

7. A cleaning head according to any one of the preceding Claims wherein the agitating means and the collecting means are mounted at fixed positions within the cleaning head and means are provided for setting the attitude of the cleaning head relative to the surface to be cleaned in order to effect the required relative movement of said agitating means and said collecting means in said perpendicular direction.

8. A cleaning head according to any one of Claims 1 to 7 wherein the agitating means and the collecting means are both mounted on a common carrier member at fixed position thereon and means are provided for setting the attitude of the common carrier member to effect the required relative movement of said agitating means and said collecting means in said perpendicular direction.

9. A cleaning head according to any one of Claims 1 to 7 wherein the agitating means are mounted at a fixed position within the cleaning head and the collecting means are mounted in the cleaning head for movement between retracted and extended positions, the arrangement being such that when the collecting means are in said retracted position the agitating means are engaged with the surface to be cleaned, whereas in the extended condition of said collecting means the agitating means is held clear of said surface.

10. A cleaning head according to Claim 9 wherein when the collecting means are in said retracted position both the agitating means and the collecting means are engaged with the surface to be cleaned.

11. A cleaning head for surface cleaning comprising agitating means engageable with the surface for agitating cleaning liquid thereon; means for delivery of a cleaning liquid to the surface in the region of the agitating means; air passage means adapted for connection to a source of suction; collecting means, engageable with the surface and communicating with the air passage means, for collection of liquid from the surface by suction; and means for effecting relative movement between the agitating means and the collecting means in a direction which, in use, is generally perpendicular to the surface being cleaned, wherein the means for delivery of the cleaning liquid is arranged and constructed to deliver said liquid at a transversely extending edge face of the agitating means, so that said liquid is caused to flow over said edge face and onto the surface being cleaned.

12. A cleaning head for surface cleaning comprising agitating means engageable with the surface for agitating cleaning liquid thereon; means for delivery of a cleaning liquid to the surface in the region of the agitating means; air passage means adapted for connection to a source of suction; collecting means, engageable with the surface and communicating with the air passage means, for collection of liquid from the surface by suction; and means for effecting relative movement between the agitating means and the collecting means in a direction which, in use, is generally perpendicular to the surface being cleaned, wherein the means for delivery of the cleaning liquid includes a transversely extending distribution duct disposed above the agitating means, the duct being closed apart from an inlet aperture and a plurality of transversely spaced outlet apertures.

13. A cleaning head for surface cleaning comprising agitating means engageable with the surface for agitating cleaning liquid thereon; means for delivery of a cleaning liquid to the surface in the region of the agitating means; air

passage means adapted for connection to a source of suction; collecting means, engageable with the surface and communicating with the air passage means, for collection of liquid from the surface by suction; and means for effecting relative movement between the agitating means and the collecting means in a direction which, in use, is generally perpendicular to the surface being cleaned, wherein the cleaning head is mounted on an operating member which is adapted to be held by a user to facilitate movement of the head over the surface to be cleaned, and the air passage means includes a pivotal connection which enables relative angular movement between the cleaning head and said operating member at least about an axis which extends generally transversely relative to the normal direction of movement of the head over said surface.

14. A cleaning head for surface cleaning comprising agitating means engageable with the surface for agitating cleaning liquid thereon; means for delivery of a cleaning liquid to the surface in the region of the agitating means; air passage means adapted for connection to a source of suction; collecting means, engageable with the surface and communicating with the air passage means, for collection of liquid from the surface by suction; and means for effecting relative movement between the agitating means and the collecting means in a direction which, in use, is generally perpendicular to the surface being cleaned, wherein the cleaning head is adjustable between respective cleaning and drying modes of operation and when the head is in its cleaning mode both the agitating means and the collecting means co-operate substantially equally with said surface, whereas when the head is in its drying mode the collecting means co-operates predominantly or exclusively with said surface.

15. A cleaning head for surface cleaning comprising agitating means engageable with the surface for agitating cleaning liquid thereon; means for delivery of a cleaning liquid to the surface in the region of the agitating means; air passage means adapted for connection to a source of suction; collecting means, engageable with the surface and communicating with the air passage means, for

collection of liquid from the surface by suction; and means for effecting relative movement between the agitating means and the collecting means in a direction which, in use, is generally perpendicular to the surface being cleaned, wherein the the agitating means and the collecting means are mounted at fixed positions within the cleaning head and means are provided for setting the attitude of the cleaning head relative to the surface to be cleaned in order to effect the required relative movement of said agitating means and said collecting means in said perpendicular direction.

16. A cleaning head for surface cleaning comprising agitating means engageable with the surface for agitating cleaning liquid thereon; means for delivery of a cleaning liquid to the surface in the region of the agitating means; air passage means adapted for connection to a source of suction; collecting means, engageable with the surface and communicating with the air passage means, for collection of liquid from the surface by suction; and means for effecting relative movement between the agitating means and the collecting means in a direction which, in use, is generally perpendicular to the surface being cleaned, wherein the the agitating means and the collecting means are both mounted on a common carrier member at fixed position thereon and means are provided for setting the attitude of the common carrier member to effect the required relative movement of said agitating means and said collecting means in said perpendicular direction;

17. A cleaning head for surface cleaning comprising agitating means engageable with the surface for agitating cleaning liquid thereon; means for delivery of a cleaning liquid to the surface in the region of the agitating means; air passage means adapted for connection to a source of suction; collecting means, engageable with the surface and communicating with the air passage means, for collection of liquid from the surface by suction; and means for effecting relative movement between the agitating means and the collecting means in a direction which, in use, is generally perpendicular to the surface being cleaned, wherein the agitating means are mounted at a fixed position within the cleaning head and the

collecting means are mounted in the cleaning head for movement between retracted and extended positions, the arrangement being such that when the collecting means are in said retracted position the agitating means are engaged with the surface to be cleaned, whereas in the extended condition of said collecting means the agitating means is held clear of said surface.

18. A cleaning head according to Claim 17 wherein when the collecting means are in said retracted position both the agitating means and the collecting means are engaged with the surface to be cleaned.

19. A cleaning head substantially as hereinbefore described with reference to and as shown in Figure 1 of the accompanying drawings.

20. A cleaning head substantially as hereinbefore described with reference to and as shown in Figure 2 of the accompanying drawings.

21. A cleaning head substantially as hereinbefore described with reference to and as shown in Figure 3 of the accompanying drawings.

22. A cleaning head substantially as hereinbefore described with reference to and as shown in Figure 4 of the accompanying drawings.

23. A cleaning head substantially as hereinbefore described with reference to and as shown in Figure 5 of the accompanying drawings.



The
Patent
Office
18

Application No: GB 9703286.6
Claims searched: 1-10

Examiner: Jason Scott
Date of search: 4 June 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.P): A4F (FSLA, FSNS, FSNF, FQMX)

Int CI (Ed.6): A47L (7/00, 11/30)

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
Y	GB 2031270 A	BIGGLESWADE See page 1, lines 20-31 & 61-71.	1 at least
Y	US 4339841	WETROK See column 1, lines 7-16, column 2, lines 36-40 & 44-45.	1 at least
Y	US 3992747	SERVICE MASTER See column 1, line 59 to column 2, line 11.	1 at least

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.
& Member of the same patent family

A Document indicating technological background and/or state of the art.
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.